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Ozarks Were Really Fun! And There Were Mushrooms...

By NAMA President, David Rust

From the plane coming into Little Rock, we could see a lot of green: to the north where the Ozarks begin, trees and waterways dominated the landscape. We could see right off that Shepherd of the Ozarks would serve as a beautiful base camp for a foray. Big Creek, which runs through the property, has cut through the layers of limestone over time, creating a beautiful backdrop. Trees were turning color, and frost touched the meadow.

On the first evening, Theo Witsell, botanist from the Arkansas Heritage Program, presented a look at local geology, habitats and the diverse botany of Arkansas, focusing first on the larger picture of plateaus, river bottoms, prairies and woodlands, and finishing with a breathtaking display of rare plants. Friday morning we ventured out into places like Gunner Pool, Barkshed Creek, Blanchard Caverns, Leatherwood Wilderness Area, Buffalo River, Ozark National Forest, Woolly Hollow, and Moccasin Springs. And there were mushrooms.

Before this year's foray, Searcy County had only five records of fungi. The initial tally for this foray is 280 species and counting, with an expected boost from participants in the PolyPeet Project, who scoured the woods for polypores and inspected incoming foray collections. Alfredo Justo led a team from Clark University's Hibbett Lab. The goal of the PolyPeet Project is to study the taxonomy and evolution of Polyporales, and produce comprehensive modern monographs in selected genera.

We found mushrooms like *Russula flavida*, *Lactarius indigo*, *Amanita daucipes*, and *Amanita polypyraxis*, *Daedaleopsis confragosa*, *Craterellus ignicolor*, *Cortinarius scaurotraganoides*, *Polyporus radicans*, and a beautiful purple collection of *Pseudobaeospora*. A host of mycologists, led by Dr. Clark Ovrebo, professor of biology at the University of Central Oklahoma, pored over the collections. According to Patrick Leacock, chair of the Voucher Collection Committee, "The most unusual was an unknown *Megacollybia* with marginate gills. Ron Petersen, who worked on this genus, only knows of something similar from Russia."



Workshops and presentations included an insightful talk by Dimitris Floudas on "Evolution of Wood Degradation Mechanisms in Mushroom Forming Fungi," in which he outlined what we know about the different processes involved in lignin and cellulose decomposition. Arleen Bessette gave a wonderful Beginner's Workshop. She covered mushroom basics and tools in a way that was understood by all attendees. Patrick Leacock gave a talk on Understanding Scientific Names, in which he outlined the current policies and process for establishing a latin binomial, and the two websites which can be used to find current data. The PolyPeet team gave a two-hour workshop on, you guessed it, "Polyporales Taxonomy and Evolution." Tom Volk presented "Latin & Greek in Scientific Names." Other talks were led by Alan Bessette, Michael Kuo, John Plischke and Nathan Wilson.

Each evening's program was kicked off by a presentation of awards to those who: 1) signed their collection labels, and 2) brought in the most unusual fungi of the day. Certainly the *Megacollybia* made the cut. Another delight was *Auriporia aurea*.

(Continued on page 3)

FORAYS & OTHER EVENTS

This section of THE MYCOPHILE is reserved for publicizing the annual forays of NAMA affiliated clubs and other events you may be interested in learning about. If you would like us to list your club's next big event, contact us with details you would like displayed here and send to the editor dianna.smith@comcast.net. See also <http://namyco.org/events/index.html>.

Please send me information about your January-February event by December 15th, 2013.

December 6-8, 2013: The Gulf States Mycological Society will have its winter foray at Camp Hardtner-Pollack, near Alexandria, Louisiana. The Chief Mycologist is Juan Luis Mata of the University of South Alabama at Mobile. The deadline for registration is November 29. For more details and a registration form, see <http://gsmyco.org>.

Sunday, 8 December 2013: After many years, the MSSF Fungus Fair is returning home to San Francisco! The Fungus Fair will be on at the San Francisco County Fair Building, in Golden Gate Park. The fair this year will be one day in length and open to the public from 10 AM until 5 PM. The entrance fee is \$10.00 for adults, \$8.00 for seniors 65 and over, and students with school id. Children 6 to 12 are \$5.00 and those under 5 are free.

If you are an MSSF member and you want to get in free, volunteer to participate on a foray, help with set-up the day before the fair, help with tear down after 5 PM the day of the fair, or help during the fair itself! Many volunteer positions are available, go to the MSSF website www.mssf.org and click on Fungus Fair, (info) for numerous volunteer opportunities.

January 18-20, 2014 (Martin Luther King Jr. Weekend): Sonoma County Mycological Association is hosting their annual SOMA Camp. It will be packed with forays, specimen tables, slide shows, top-notch speakers and workshops on cooking, cultivation, dyeing and polypore paper-making and photography. For adults staying in the onsite cabins the cost is \$325. Participants under 13 years of age pay \$200. The cost for adults staying offsite is \$200, with children under 13 at \$165. For more information see www.somamushrooms.org.

January 24-26, 2014: The fifth biannual *All California Club Foray (ACCF)* will be held in January 2014 in Albion, California. Chief mycologist, Dr. Terry Henkel, and grad students from Humboldt State University will assist with taxonomy. This event includes catered meals, comfy lodging, and mushroom hunts in the bountiful Jackson Demonstration State Forest near Mendocino. This foray is open to any current member of a California mushroom club and NAMA members. Cost is \$175 per person and includes two nights lodging and all meals from Friday evening through Sunday breakfast. Pre-registration is required. Registration and detailed information can be found at: <http://bayareamushrooms.com>.

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(Continued from page 1) Other activities included a cultivation presentation by Steve Russell, and a well-attended, delicious mycophagy session prepared by Ursula Pohl and a team of mushroom loving enthusiasts. The last evening program was a presentation by Jean Lodge, research mycologist with the USDA-Forest Service, Center for Forest Mycology Research, Puerto Rico. Dr. Lodge's talk on Hygrophoroid fungi was illuminating to all, as she showed our current understanding of the family Hygrophoraceae. She presented concrete examples of select species in a clade, and then quizzed participants as to how comfortable they felt including that species as representative of waxcaps. And she even included a synoptic key!

Evening socials were very popular. Britt Bunyard brought homemade cheeses from Wisconsin. Bruce Boyer and Martin Osis went to the local grocery establishment (Walmart, wasn't it?) and pitched in sausages, cheese, crackers, and other delightful comestibles. Thank you to everyone who helped make these gatherings successful.



I've got to say: Jay Justice organized a great foray. His team of Arkansas Mycological Society members including Tim Jones, Jerri Hoskyn, and Ron Moore, shuttled participants to and from the Bill and Hillary Clinton Airport in Little Rock up to the foray site at Shepherd of the Ozarks, and to mushroom collecting sites as well. A team of voucher collection staff, including Joshua Birkebak, Emma Harrower, Brian Looney, and Marisol Sanchez-Garcia, did a great job shuttling mushrooms from the collection area into displays and onto the dehydrators. Tom Volk, Brian Manske, Roz Lowen, Dianna Smith, Ron Petersen, Alfredo Justo, Otto Miettinen, Dimitris Floudas, Beatriz Ortiz-Santana, Scott Bates, Walt Sturgeon, David Lewis, Andy Wilson, Andy Methven, Jean Lodge, Alan Bessette, Arleen Bessette, Michael Kuo, Bill Yule, Debbie Viess, John Plischke III, Daniel Winkler, Michael Kuo, Nathan Wilson... and Jay Justice, all weighed in on the identification process and moved specimens to the tables.

It was delightful to see long-term NAMA members, professional and amateur mycologists, and first time participants at this very successful foray. Thanks to all who traveled far and wide to attend. See you next year, at the 2014 NAMA foray in Camp Arnold, Washington near Seattle, hosted by the Puget Sound Mycological Society.



Waiting for buses to walk sites



Hunting along the bluffs



Dining Room Conversation



Drop off area near firehouse for collections



Photos by Steve Sterling and Dianna Smith

IT'S A TASTY TREAT! IT'S A DEADLY PARASITE!

IT GLOWS IN THE DARK! IT'S... IT'S A HONEY MUSHROOM?!

By terraBrie Stewart, B.Sc.

It's a warm, humid night in the boreal forest. Your fire is waning and sleep is beckoning you with her warm, motherly embrace as the embers cool. Overhead the Northern Lights are performing their climactic act adorned in their azure, violet, and cyan robes—the cloths merging and separating like the hands of lovers, forever reluctant to part. A ballet of flirting fireflies dances around you in the shadowy hollows. Entranced, you work your way through the veil of darkness to your tent. Your body halts unexpectedly—your eyes take control of your conscious existence—they blink once and then again. Are you being deceived? With a wrinkled brow you are drawn to the ground. There, beneath your weary feet, a lambent elfin green defies the cloak of darkness. You cautiously collect some of the unearthly light just in time for sleep to kiss you goodnight. Awakened by the dawn, you are anxious to find the source of the mysterious glow and unveil someone's practical joke—but your search is in vain; your scrambling hands uncover nothing more than a few pieces of old rotting wood.

DOUBLE, DOUBLE TOIL AND TROUBLE; MUSHROOMS GROW, SUPERSTITIONS BUBBLE

Mushrooms have been the source of a great deal of superstition, myth, and folklore throughout most of recorded human history, and with good reason. The Kingdom Fungi is host to many strange, biological phenomena such as color changes of the flesh, poisonous and hallucinogenic qualities, offensive odors, rapid growth, and bioluminescence. The uncanny, rapid, and often overnight emergence of these enigmatic life forms was the basis behind a long-standing cross-cultural belief that mushrooms were spawned by the interaction of thunder and lightning. In the Middle Ages, their rapid growth contributed to mushrooms being relegated to the realm of the occult. They were seen as the craftsmanship of evil spirits, witches, or the devil, and numerous folktales animated the occurrence of human diseases brought on by eating or touching them. The suspicious nature of some mushrooms to grow in circles, or “fairy rings”, led people to believe these were dangerous places where elves danced, toads met, deer rutted, or the devil set his churn at night. Superstition likely had a hand in naming many mushroom species including Witches Butter, Witch's Hat, Elfin Saddles, Elfin Cups, Fairy Hair, Fairy Stools, Destroying Angel, Satan's Bolete, and Devil's Urn. Like fairy rings, glow-in-the-dark mushrooms and mycelia (the non-reproductive “root” portion of a fungus) have also been the subject of ancient myth and wives tales. In Saskatchewan, we are lucky enough to share our home with a species of bioluminescent fungi that has contributed to these tales of old-- *Armillaria mellea*, commonly known as the honey mushroom.



Armillaria gallica

LUMINESCENT WOOD—MY BRILLIANT CAREER

The honey mushrooms, which impregnate decaying wood, an eerie blue-green glow in the woods, are known as foxfire. “Foxfire”, “touchwood”, and “fairy sparks” are folk names for bioluminescent rhizomorphs (tough root-like strands of mycelia) which find the source of their life in the death of another. The term foxfire is a derivative of the French “faux fire” or false fire; “fairy sparks” in decaying wood were believed to reveal the places where fairies held their nightly revels. It is not surprising that these glowing pieces of wood were once thought to be potent sources of magic.

Documentation and legends describing encounters with this phenomenon have been woven into ancient Greek, Roman, Indian, and other texts. The Greek philosopher Aristotle noted the “cold fire” light; the Roman naturalist Pliny mentions luminous wood in olive groves; in 1658, Swedish historian Olaus Magnus writes of the use of luminescent wood in Scandinavia: “that by the light of it, as by a lighted candle, [people] may more securely go into places

full of combustible matter, as are barns in winter, that are full of ripe corn and hay”.

These luminescent woods have also served warriors in conflict. Both Spanish soldiers in the West Indies and soldiers in the trenches during WW1 affixed glowing wood to their helmets so they could recognize each other in the dark. During WWII firewatchers in timber yards covered the brightly glowing wood with tarpaulins for fear that enemy aircraft would spot it.

In the tropics, where glowing fungi abound, girls are said to attach foxfire to their hair when dancing at night and aboriginal peoples were known to attach luminous fungi to their bodies to prevent the explorers, who they were guiding through the forest, from getting lost.

These enchanting organisms have even found their way into both classic and contemporary literature. The epic saga of Beowulf alludes to glowing fungi when describing a particularly ominous place: “It is not far from here - if measured in miles that the lake stands - shadowed by trees stiff with hoar-frost. - A wood, firmly rooted frowns over the water. - There, night after night, a fearful wonder may be seen - fire on the water... That is not a pleasant place.” The “fire on the water” most likely refers to a fungal luminescence on rotten trees growing in a swamp. Mark Twain, in *The Adventures of Huckleberry Finn*, mentions this special wood as “rotten chunks that’s called foxfire, and just makes a soft kind of a glow when you lay them in a dark place”.

The extraordinary long lifespan of honey mushrooms make it possible for someone to stumble upon one of the very fungi that inspired Olaus Magnus’ illuminating composition. Honey mushrooms hold a place in Earth’s Longevity Hall of Fame and they share this hall with other inductees such as the giant tortoises (177 years), English ivies (440 years), lindens (815), Sierra redwoods (2300), and bristlecone pines (4900 years). *A. gallica* in particular has earned its well deserved reputation by living up to 1500 years; *A. mellea* are estimated to live for 450 years.



FUNGAL FACES IN THE FOXFIRE FAMILY PHOTO ALBUM

Although it is only the actively growing mycelia of the honey mushroom that exhibit luminescence, there are other species with glowing fruiting bodies; the best known are the Jack-O-Lantern Mushroom (*Omphalotus illudens*), *Panellus stipticus*, and *Pleurotus japonicus*. Several species of *Mycena* are also luminescent and it is one of these tropical species that may have been the inspiration for “torches” used in the animated movie “A Bug’s Life”. For the most part however, luminescent fungi exist as small tropical species frequently encountered on decaying leaf matter.

In all these species, the mechanism of the light emission is the same. First, the fungi load chemical energy from respiration or photosynthetic processes onto a molecule called a luciferin (meaning fire carrier). This luciferin combines with an enzyme called a luciferase in the presence of oxygen. The resulting end products are water, an energetically decayed luciferin, very little heat, a photon of light, and a source of wonder and beauty worldwide.

TO GLOW OR NOT TO GLOW—WHY IS THE QUESTION

The ecological or biological purpose of fungal bioluminescence is greatly debated. The known functions of bioluminescence in other organisms include the attraction of mates or prey, the illumination of plankton for feeding and, most commonly, various forms of defense. None of these explanations are appropriate for the fungi. Like luminous bacteria, fungi have a steady glow; this property is more likely to attract organisms than repel them. Several authors suggest the role of bioluminescence in fungal fruiting bodies is to attract animals for spore dispersal. However, this theory does not account for species in which only the mycelia are light producing, as is the case in the honey mushroom. In earlier days, a theory was put forth that bioluminescence was a means to release excess energy without releasing heat. Another theory proposed this process was used to sponge-up oxygen radicals that could damage tissues. Various soil/fungal interactions have also been suggested. Perhaps the ghostly light serves as an attractant to invertebrates that would prey on smaller invertebrates grazing on the fungal mycelium. To date, the true “purpose” of fungal bioluminescence remains an ecological mystery.

FOXFIRE, FOXFIRE, WHERE ART THOU, FOXFIRE?

One element that adds to the magical allure of these specters of the woods is their elusive nature. To improve the odds of catching a glimpse of foxfire, pick a warm, overcast, or moonless night without surrounding artificial lights. In our boreal forest, late summer and early fall are ideal times for a midnight foray. Look for wet logs marred by telltale signs of fungal infestation--bark that's streaked and splotchy and studded with soft mushrooms. You may see the glow right away, but usually you'll have to scoop out chunks of soggy wood and stir them around. Once exposed to an oxygen source, the mushroom's enzymes begin to shine a bright, elfin green. You can also get a head start on the foxfire hunt by spending time in the day seeking out fruiting bodies- where there's fruit, there's root! Of the fleshy fungi, *A. mellea* are among the most variable in color, shape, viscosity, and manner of growth, but there are several relatively constant features that distinguish it. These features are the presence of a veil; the tough, fibrous stalk; frequent presence of small dark hairs on cap; the bitter taste when raw (undetected by some people); the growth on wood (though it may be buried); and the white or faintly yellowish spores. The cap is usually honey colored (which accounts for the species name *mellea*, which means "pertaining to honey" or "honey-colored") and can be scaly or smooth. These mushrooms are frequently found in large clumps on stumps and other dead wood and at the base of live poplar trees.

IF FUNGI BE THE FOOD OF LOVE, COOK ON

All strains of the honey mushroom are edible. This species is admired in many countries for its firm, meaty texture. However, like many wild mushrooms, the honey mushroom can be "perked up" with culinary adjustments to increase its palatability. First of all, it is recommended that you only use young firm caps and discard the tough stalks. Some forms of the mushroom have a slightly bitter aftertaste that is easily combated by parboiling the caps for 5 minutes and discarding the water before use. Keep in mind that some specimens are superior to others, and some may cause digestive upset. Honey mushrooms can also be slimy and the easiest antidote to this sliminess is cooking it with something acidic such as lemon juice, cooking wine, or vinegar. When dried and reconstituted, the honey mushroom is quite agreeable in soups, stews, and mushroom loaves. This fungus is also appropriate for pickling as a means of long term storage.

Be aware that the common name refers to the golden color of the mushroom cap and not to taste--so do not expect something sweet on your palate! And remember, before eating ANY wild mushroom, be confident you have successfully identified your specimen. Beginners should only eat those mushrooms clearly growing in clusters on wood, making certain the spore print is whitish. Consult many different field guides or better yet—consult an experienced mushroom collector.

SOMETHING IS ROTTEN IN THE MIXED WOOD FOREST

Armillaria root disease, also known as shoestring root rot, is considered a serious and destructive parasite of many trees economically important to the timber and ornamental forest industry. This fungus is mainly a pathogen of broadleaf trees in ornamentals, parklands, natural woodlands, and fruit orchards, but it can kill young conifers planted where broadleaves were felled. It is called shoestring root rot because of its tough, stringy, black, mycelial strands (capable of withstanding fires and surviving long periods of drought) by which the mycelium spreads. These runners may scale the host's trunk or infect neighboring trees by traversing great distances through the soil. It generally feeds on the roots and lower trunk of its host, reducing it to a pathetic, white spongy pulp. Large trees engage in a tug-of-war battle with these frequently fatal fungi by imprisoning them for years within cankers on roots or the root collar. Suppressed in their cell, *Armillaria* eats away at the wood beneath the lesion but its damage remains localized. The wounding effect of the fungi is observed on its victim as reduced growth, yellowish or undersized foliage, premature leaf drop, branch die-back in the upper crown, or rapid browning and death during summer.

Armillaria root rot is a prevalent disease of young coniferous trees in the Prairie Provinces; in Alberta this disease is one of the main causes of mortality in young lodgepole pine. Jack pine and white spruce plantations in Saskatchewan have experienced some losses due to *Armillaria* root rot and red pine plantations in Manitoba are particularly vulnerable to this relentless pathogen. The young pines affected by this disease stop growing, turn color to an off-green, and then suffer an early death.

Although this fungi is often cursed by the forestry industry, it should be noted that it is one of only a few specialized fleshy fungi with the ability to recycle nutrients by degrading wood, an important ecological function that has evolved as part of our natural environment.

A MUSHROOM BY ANY OTHER NAME...

Until recently, the name *Armillaria mellea* was used collectively to describe what is now believed to be more than 11 different North American strains; unfortunately, these strains are virtually indistinguishable without DNA analysis. The discovery of these strains shed insight into the high degree of lifestyle variability occurring across the species' range. In some areas *A. mellea* was found to be extremely virulent and other times saprophytic and entirely harmless. The division of this species has allowed for accusing fingers to be pointed in a more specific direction when targeting the pathogenic culprit.

Some field guides refer to *A. mellea* as *Armillariella mellea*, which reflects a recent trend to afford the honey mushrooms their own genus. This taxonomic debate has been resolved, ruling in favor of *Armillaria*, and these two genus names are now synonymous.

Due to its worldwide distribution, the honey mushroom has many ethnic aliases. In France you may meet the honey mushroom under the name tête de Méduse, meaning head of Medusa; in Germany, hallimasch; in Ukraine, pidpanki, meaning at the bottom of the stump; and in the Netherlands, honingzwarn, meaning honey fungus.

A FUNGUS FOR ALL SEASONS

Members of the Kingdom Fungi are often overlooked by the naturalist community. They generally aren't endangered or threatened, they don't sing, or fly, they don't travel in packs, and they don't have a complex social structure. Still, we must remind ourselves that out of this Kingdom comes not only a delightful and diverse food source in the form of mushrooms, but also penicillin, alcohol, leavened breads, ripened cheeses, and biological means of controlling insects. Fungi can also be our bitter foe when rotting our food, causing plant diseases including the Irish Potato Famine, and giving us diseases ranging in severity from athlete's foot to cancer. Friend or foe, fungi are a charismatic and fascinating element of our environment.

The honey mushroom is a particularly delightful inhabitant of our province. Whether you are an enthused mycophagist searching for a meaty treat, a forest pathologist hunting for a charismatic killer, a nature photographer looking for another pretty face, or a determined detective seeking out foxfire, *Armillaria mellea* offers us it all. For children who are innately intrigued by things that glow, a search for this magical wood is a cool way for them to establish and strengthen a bond to and appreciation of the natural world.

NAMA Needs You

By David Rust

A report on the Board of Trustees meeting will run in the January issue, but in the meantime, I have three requests:

- *The trustees decided to conduct an audit of our financial records. We would like to find a NAMA member who lives close to Herb Pohl in New Jersey and will conduct an impartial audit.*
- *If you'd be interested in taking over as NAMA's webmaster, I've been doing this since 2009 and would love to have someone with good skills and ideas have at it.*
- *NAMA is going to begin a fundraising program. If you could help NAMA put together a cohesive, thoughtful, and strategic approach, please contact me.*

If you can volunteer, please contact David Rust, 510.468.5014 or david.rust@sbcglobal.net.



'Magic' Mushroom: Chinese Fungus Glows in the Dark (Op-Ed)

Taylor Lockwood | August 22, 2013



Mushrooms of the genus *Favolaschia* are well known to science, but scientists didn't realize the species of *Favolaschia* depicted in the image glows in the dark as it decays.

Taylor Lockwood is a mushroom hunter and photographer who has presented his work at shows throughout the world for over twenty-five years and has archived his photographs on the site Mushroom.Pro. Lockwood contributed this article to LiveScience's [Expert Voices: Op-Ed & Insights](#).

On a recent trip to southern China, I came across glowing mushrooms while walking through a bamboo forest on my way home from dinner.

People have recognized bioluminescence in mushrooms for thousands of years, but the advent of LED lights, better photographic technology and expanding general interest have increased the numbers of known glowing mushroom species and the knowledge about such mushrooms.

The glowing mushroom I saw in China — part of my work supporting a Texas Tech University/National Science Foundation student research project — is a bamboo mushroom that's relatively common throughout tropical Asia. In the genus *Favolaschia*, it is characterized by having a lateral stem (stipe) and wide, bulbous pores instead of gills.

Yet, the fact that this species of *Favolaschia* is bioluminescent has apparently been unknown to science until I recognized the glowing this summer. Researchers that specialize in bioluminescence and the chemistry that causes it are now studying the fungus.

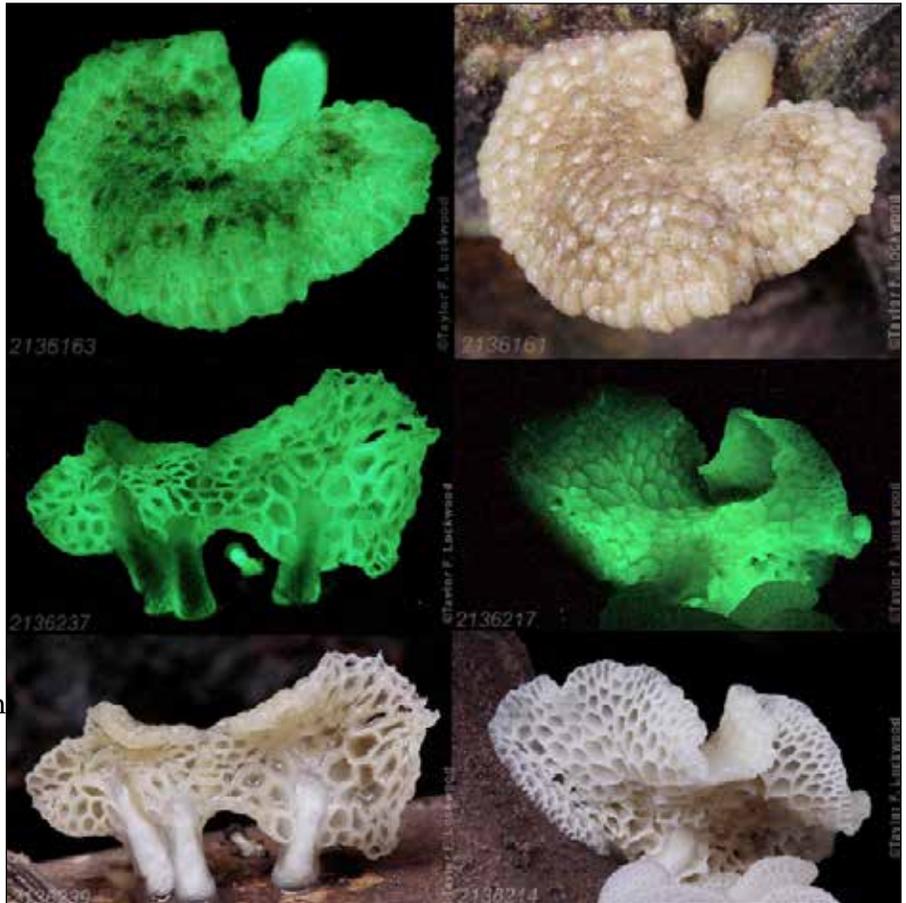
Not all *Favolaschia* are bioluminescent, and interestingly, this species from China only glows when it starts to decay — not when it is fresh, which is when many other fungi glow.

Asia, Brazil and Australia are hotspots for bioluminescent mushrooms, but the organisms are found all around the tropical world and in some temperate areas as well.

Researchers believe that the bioluminescence affects the dispersion of spores by attracting insects that carry them away while consuming the fungus or during other routine activities.

The bioluminescent mushroom hunts have been some of my most exciting, as I often go deep into the rainforest, alone, at night, and walk with the lights off as much as possible. In the past, I've had encounters with bats, snakes, spiders, peccaries and barking deer that can be absolutely hair-raising.

This trip is part of a worldwide quest to find and photograph bioluminescent mushrooms, whether known to science or not. Having already been to Madagascar, Brazil and China this year, I'm now planning my locations for 2014.



On a visit to China this summer, mushroom photographer Taylor Lockwood discovered these glowing mushrooms while returning home from dinner one night. Until Lockwood captured these photographs, scientists didn't realize this species of *Favolaschia* glows in the dark.
Credit: Taylor F. Lockwood

The views expressed are those of the author and do not necessarily reflect the views of the publisher. This article was originally published on www.LiveScience.com.



Cesar Herrera Awarded 2013 NAMA Memorial Fellowship

Cesar Herrera, doctoral student at the University of Maryland, is the recipient of the 2013 NAMA Memorial Fellowship in honor of Ernst Both. The title of his project is “Cospeciation of the mycoparasite *Cosmospora* with its associated fungal hosts”. The MSA selection committee found that this project included a compelling combination of morphological and molecular methods, and was one of the most interesting and innovative proposals submitted this year.

MUSHROOM PRODUCTION RISES TO MEET GROWING DEMAND

By Kate Campbell

Mushrooms, once a minor California crop, have stepped into the spotlight. And consumers are applauding with a growing appetite for the healthful fungi—not just the familiar button varieties, but also more exotic species.

National mushroom sales last year topped a record \$1.1 billion, up 8 percent from the previous crop year, according to data from the U.S. Department of Agriculture. The national growth in mushroom sales last year outpaced growth in total produce sales.

Pennsylvania produced more than 60 percent of the mushrooms grown in the U.S., with California the second largest producer at about 20 percent of the nation's production.

Worldwide mushroom production has increased twenty-fold during the past 30 years, analysts said, with much of that increase occurring in the 1980s and 1990s.

In the U.S., for example, production of agaricus (button) mushrooms during the 1981-82 crop year totaled 517 million pounds, but by the 2011-12 crop year, production had increased about 70 percent to 880 million pounds.

And, during the past 20 years, specialty mushrooms—primarily shiitake and oyster—increased from about 4.2 million pounds to nearly 18 million pounds in 2011-12. There are now more than 86 edible fungi varieties grown in California.

“I credit a lot of the market growth to the Mushroom Council,” said Gary Crouch of Mountain Meadow Mushrooms in San Diego County. “What’s happened during the past decade is the council has been really active in promoting mushrooms and they’ve done a spectacular job.”

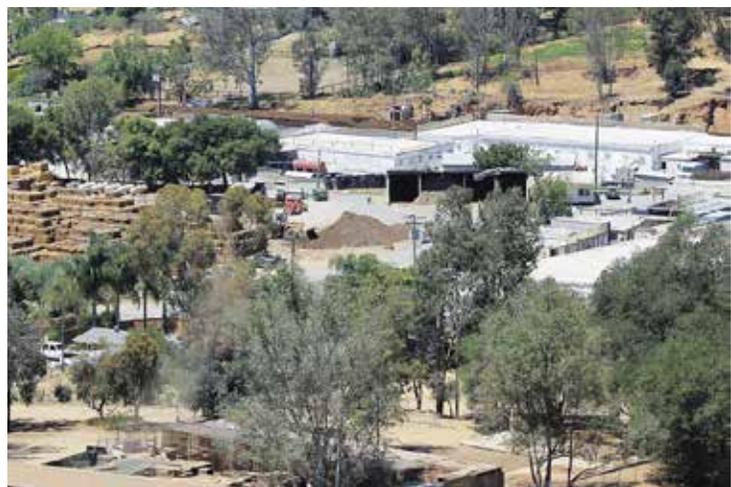
Today, Crouch said he sees stories about mushrooms everywhere in the media, featuring leading chefs and aimed at consumers and institutional buyers. There’s also a growing public interest in how mushrooms are produced, he said, noting that a farm tour program sponsored by the San Diego County Farm Bureau several weeks ago brought more than 700 people to his



Gary Crouch of Mountain Meadow Mushrooms



Worker sorting mushroom buttons



Mountain Meadow Mushrooms Facility in San Diego, CA

Escondido operation. Retail data from the Mushroom Council indicate growth is taking place not only in California's regional consumer markets, but across the U.S.



Growing bins

“This increased growth compared to total produce growth is especially exciting during the summer,” council President Bart Minor said. “The salad season usually brings increased eating occasions for fresh mushrooms, but this dramatic growth can also be attributed to increased information about the nutritional benefits mushrooms provide, particularly vitamin D, the only produce source of this nutrient.”

“With the nutritional value they’re finding in mushrooms, I see sales growing,” Santa Clara County farmer George Chiala said. “I also see it requires a large capital expenditure to get into commercial mushroom production. That’s a deterrent to farmers jumping into growing the crop. It requires more than a dark, quiet place for

growing.”

He also cited mounting regulations as hampering increased production statewide.

Although his farm has been in operation for about four decades, Chiala said he didn’t get into mushroom growing until about 10 years ago.

“We were processing mushrooms at the time and looking to establish a steadier supply,” he explained. “I push the pencil really hard and I saw mushrooms as a growth area, but not to the extent we’re seeing it now. Prices and demand have increased, but so have growing costs.”

In the future, Chiala said he expects steady growth in market demand.

“I’m optimistic about growth,” he said. “But it’s a difficult crop because of the amount of control required to maintain quality—temperature, disease, sanitation—all require constant attention and hands-on labor.”

Far West Fungi, a mushroom specialty shop in San Francisco’s Ferry Plaza, tries to offer a mushroom for every taste, selling a wide selection of colors and flavors. The majority of these specialty mushroom varieties are grown in Monterey County on shop proprietor Ian Garrone’s family farm.

The Garrone family grows mushrooms year-round in more than 60,000 square feet of greenhouses near Moss Landing. Although they experiment with different mushroom varieties—more than 40 wild and cultivated varieties are offered at the San Francisco store—their primary crops are shiitake, tree oysters, king trumpet, bear’s head and maitake. In addition, the family continues to sell mushrooms through farmers markets.

Garrone said the farm’s specialty mushroom production of a couple hundred pounds per week is a significant increase from the minor amount produced 20 years ago.

(Kate Campbell is an assistant editor of Ag Alert. She may be contacted at kcampbell@cfbf.com. California Bountiful television producer and host Tracy Sellers contributed to this story.) Special thanks to Ag Alert and the California Farm Bureau Federation.

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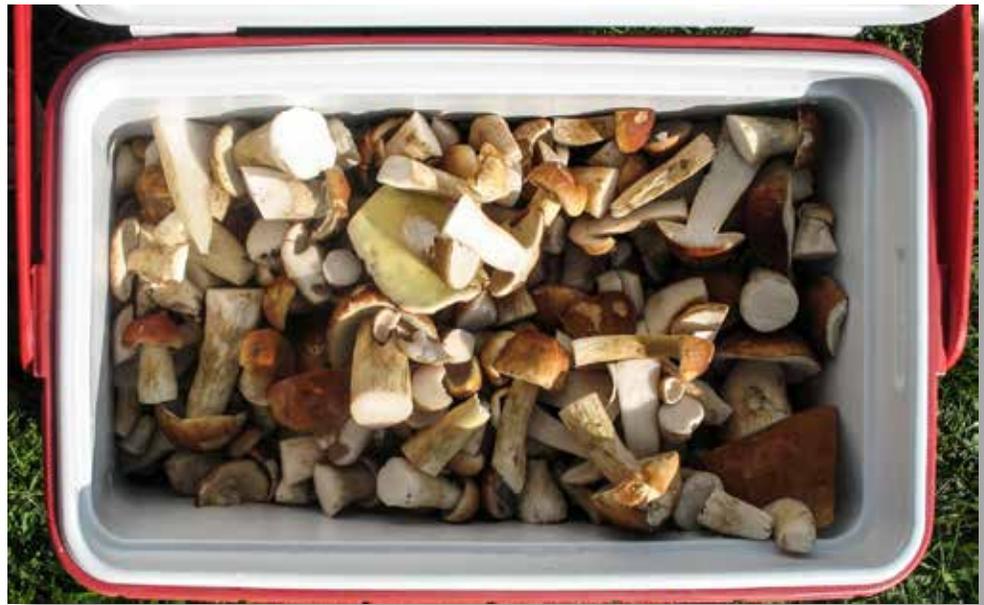
MY DESCENT INTO THE DARK SIDE OF FORAGING

By Walt Endicott

Morels, chanterelles, and that was about it! The safe easy ones that parents try to teach kids was the limit of

my mushroom knowledge. Unconsciously, I was waiting for a book about our native mushrooms from some guy, who had spent years crawling around in mud, tuckamore, mosquitoes, ants, hornets, and black flies. Not some book by a guy from Michigan State about NE North American Mushrooms (actually all below the 49th parallel) but a book based on actual field work done right here. As an outsider, I spent 6 days a week in the woods, whether I wanted to or not. However, with the economic collapse of 2007 I suddenly had a lot of extra time on my hands. Exactly then the book I didn't know I was waiting for came. I became hooked on photographing, identifying, and learning a few things about the ecology of our mushrooms. Even bought a few more books, including that Michigan guy's one. I was soaring around via Google Earth, scanning forest inventory and soil maps, and always yearning for new habitats to catalogue that next elusive species. Along the way I had found some rather nice "secret patches", and began to connect a few ecological dots that resulted in some "super patches". I knew I was in trouble when I discovered I had spent 26 days straight, daylight to after dark, one August, hunting mushrooms. Yes, I had the fever. Drat the day I bought that accursed book in Deer Lake Airport!

The freezer was full, neighbors and friends supplied, and still my super patches were burgeoning with booty, often with but 1/100th of the treasure picked. What do to? I started giving my sites away like free trips to the Dominican. Piles of rocks along a farming road told the farmer where to duck into the woods to collect a quick cooler load of lobster mushroom for the buyers of his ducks from St. John's. Red flagging tape marked an abandoned dairy farm field loaded in stumps with honey mushrooms (*Armillaria sp.*). Some European friends claimed a super patch of winter chanterelles (*Craterellus tubaeformis*) with thanks. Another, a granite boulder marked a hidden north facing old growth hill loaded in sweet tooth (*Hydnum umbilicatum*). Still the super patches kept accumulating. Finally, I broke down and called a serious wholesaler. Hmmm. \$15 a kilo for fresh and \$150 a kilo for dried *Lactarius helvus*, eh? That last patch must have 100 pounds on it in under an acre, if you don't drown in the bog like a condemned horse while collecting them. 44 Kg x \$15... what the hell! After that first quick and easy \$660 I was hooked. OK, I had become one of them! Those nasty, global-shipping food traders. I had sold out. I had visions of living in a van down by the river with the other typical mushroom gatherers—hiding from Revenue Canada, a parole officer, and an ex-wife. No wonder this attracts the... er, um... traveling and free living type of people! Cash, no laws regarding shipping across provinces (federal or provincial), no permits, no regulations at all, at all! Even the Canadian Food Inspection Agency told me to go away and not bother them with my worries about regulations and food items!





44 kilograms ready to go!

Wait a minute, the buyers want King Boletes (*Boletus edulis*) at \$40 a kilo? Well, have I got a patch to keep them happy! Missus, kindly book us some tickets to Norway for some salmon fishing! We just won the lottery! I quickly got an education about shipping rates and packaging. Mondays, Fridays, and weekends were out of the question for air shipping. 22Kg was the optimal box weight for Air Canada. For Canada Post, the ideal weight was one box between 22Kg and 26Kg. Or two big apple boxes duct taped together. Spacers and cardboard layering sheets found in apple shipping boxes allowed stacking mushrooms in layers without bruising or smothering. The fine chap at Dominion loved new salmon flies and I tied too many every winter anyway.

I was quickly up to my eyeballs in free but valuable apple boxes.

A friend, shanghaied into this madness, was busy duct taping a large, tall laundry basket to an aluminum backpacking frame, and talking with the Head Chef for the Sheraton chain of hotels in Atlantic Canada. Sadly, said friend was hooked, too. I had developed friends in Montreal, Toronto, Guelph, and Calgary, all eager for more of our fresh, wholesome mushrooms. But now what do I do? I can't go picking every day. Do I show others my secret patches? Do I train others and explain my techniques using maps, altitude, slope, aspect, stand age and structure, soil maps, and things? What about quality control and trust? Each basket had to be able to be tracked back the picker and a single mistake meant instant firing of friends!

Hmmm. Maybe it was time to contact the government and maybe the local Foray group. I think there is a market for this stuff and a good cottage industry; everyone enjoys a fast \$5,000. In BC, \$15,000,000 worth of this activity is reported to Revenue Canada. Our most respected review of this industry in North America suggests that many of our wild mushroom species have a global market worth in excess of \$1,000,000,000 each annually! One group in Québec collected over \$100,000 worth, and one of my buyers wants 2-3,000Kg of lobsters a year! While we do not have the diversity or abundance of commercial species like BC, Washington, Oregon or California—not even Québec—we do have a few shekels' worth here, the picking of which we'd love to report to Rev Can!



(*Hypomyces lactifluorum*) getting set to meet their buyers

COMMERCIAL PICKING 101

by Walt Endicott



Boxes of chanterelles awaiting packing

DANGERS!

Parking. A ridiculous issue, but a two foot shoulder is not enough. Park and walk back. Do heavy pick-ups on straight-a ways quickly! Leave the keys with the car and show or tell everyone where they are stashed.

Flats. Your 2 ply city tires just won't cut it.

Even with 6 ply off-road tires you'll want some 6"x6" blocks, "fix a flat" (air and sealant in a can—it doesn't work worth a darn but will help cripple you out), electric pump that has been checked to make sure the cord will allow reaching all tires, etc, etc. Test run for a flat in your driveway. Finding the spare is on a crank down wire that is rusted or seized into place 20 km from cell service is never funny on a hot or rainy day and will result in your buying all the beer that weekend.

Hornets. You will discover their nests and you had better run fast and far while taking everything (packs, GPS, water, baskets, compass, etc) with you. The ones in the ground are the worst. No big deal unless you discover you are allergic or have to drive with 3 or more stings and feel faint and very ill. Epipens are about \$100 but worth having, if going in a group.

Orienteering. Be careful on cloudy days if on flat ground or dense wood. Keep an eye on the sun and the direction you are heading! Have a reliable GPS, make sure it works, the batteries are fresh, have spares, and know how to use it. Gadgets only work when they actually still work, and only if you don't lose them. Always carry a map and compass for back-up.

Eagle eyes and Bell satellite/cell sticks. These are great things to have with a laptop or iPad but a expensive at \$150 for start-up and \$40 a month. They can be de-activated during the non-picking season. They allow last minutes plan changes while still being able to access Google Earth, weather, etc. in areas with cell service. Sun. Sun screen, chap-stick, sun screening shirt and hat with brim or cap with visor (I know, a real nuisance in the woods!).

Dehydration. Always have water, as, or on, ice in the vehicle and in your pack. I half freeze mine then drink it as it melts.

Storage. Coolers with 2L plastic bottles full of frozen water keep mushrooms firm and chilled until they reach home. Park the vehicle in the shade if you can.

Drying

For many mushrooms, most buyers will pay a little extra for fresh and some will pay a lot more. It depends on the end use of the mushroom and how well it rehydrates. Dried *Lactarius* in the candy cap group (the ones that smell of coconut, maple syrup, etc) are used as a dried shaved spice, so drying may even result in higher prices than fresh! Morels—but you probably won't have to worry about them in Newfoundland and Labrador. Boletes do well dried, but for some reason are preferred fresh. Corals are best dried. Fresh Chanterelles are best sold fresh. They tend to get bitter when dried, but still sell well, so weekly profit margins and shipping frequencies/volumes will dictate what to do. Cats (*Catathelasma ventricosum*) and lobsters are invariably wanted fresh and prices plummet for dried. Honey mushrooms are best sold fresh locally, as demand is weak and prices low because they are abundant on the mainland. When selling locally, you can reduce the price by \$2 a kilo for shipping. Selling in the USA and EU requires some permits and paying a ridiculous anti-dumping tariff (like \$0.01 a pound) but can be done at significant profit margins. It is cheaper to ship to London England or New York, where prices are often premium, than to Alberta!

Methods. Use food grade everything when handling mushrooms and keep it all clean. Buckets need lids to keep needles and dirt out during harvesting and should be non-lacquered/treated wicker or wood or food grade plastic. Do not lay them on plastic on the ground or floor as they may sweat. Ideally, lift them on large metal screened frames. Sun drying is always best—gills up for home consumption! Sun drying can increase the vita-



Boletus
edulis

min D content in mushrooms by as much as 100,000%. No joke, it has been tested. Despite its fragility, vitamin D may keep as long as a year once locked in a dried mushroom. Drying racks need to be screened with stainless steel or new unweathered food grade plastic-covered fiberglass screens (NOT galvanized!). Mushrooms absorb smells, so no diesel, rotting seaweed, lawn mowers, etc. nearby. A tarp, deck or tent fly protects from showers. Thin papery ones like winter chanterelles, corals, graylings, etc. dry fast (1 to 2 days). Medium density and larger mushrooms like big *Lactarius* may take a week. Big meaty king boletes and chaga may have to be sliced or chopped first. If it is wet and rainy outside for an extended time, use an electric dehumidifier (\$200) and air-tight room or box. Drying also hides larvae; grinding dried mushrooms eliminates this quality issue. Winter harvested chaga and artists conks (worth \$6 each) can be dried with a 1500W indoor space heater that has a fan.

Finding Them. While forest inventory maps, soil maps, topo maps with elevation, forest fire maps, etc. are all helpful and in some cases critical, nothing beats ground pounding. Every book says burnt sugar milkies (*Lactarius helvus*) only grows on wet Sphagnum bogs right? But, large quantities also grow on dry, well drained soils, in a variety of tree stand types and ages, in the cooking sun (photo, right). Locating these hidden patches is hit or miss, best done with a sharp nose after a dry spell. The only way to discover this is to hike some ground. Use light, contrast, angles, and/or tinted sunglasses. At 9 am we found only a few patches yet when walking back over the exact same ground at 2 pm, from a different angle, we saw a bonanza of patches from 50 yards away! Walk up hill and you see them white stalk first, walk downhill and you see little of their camouflaged caps. Walk east or west during mid day and the mushrooms and their shadows can stand out, but walk north or south and they vanish on the same slope at the same time! For others the reverse is true and the sun on their stalks with no shadows makes them virtually glow. Finding good densities is best done if you follow topography, such as ridges,

glacial kames, brooks, and other land features. Once you find a good patch, stand back and look at the bigger picture via Google Earth. Are there similar features nearby?

Timing

Young and firm, with limited or no larva or slug bites. Pretty straight forward. But what about season lengths? Having one good patch that produces 100 pounds fairly consistently during the first week of September is great; but what of August and late September? The keen picker is always looking for two things—new patches and timing. Temperature and humidity are the keys. The season for “narrow windowed” species can vary up to 6 weeks with altitude, misty pond and lake shores with prevailing winds, north or west facing dew drenched hills, rainy valleys, river mists, proximity to the ocean, etc. I have picked sweet tooths and winter chanterelles that were over-ripe in late July. While I enjoy a Viking approach and 100 pound takes of a single species all at once, others enjoy driving from patch to patch weekly, collecting small amounts at each location spanning 2 or 3 months. Some patches are like that, especially lobsters, Newfoundland chanterelles, Lactarius, and some boletes. It is wise to make sure your buyers understand your patches and methods to insure that they are happy with 5 pounds of this and 8 pounds of that when making up big shipping boxes. If you build a repertoire, they will sometimes negotiate a flat price per kilogram and take what comes. If you pick by happenstance then each species should go into separate containers in your pack. Necessity, a drill, and hot glue are the mothers of invention when designing pack frames that have 10 or more lids with easy access (picture a honey comb on an aluminium pack frame). Taking it off every 50 feet is a pain, whereas single species raids can be done by simply dropping the mushroom over one’s shoulder into a tall flip lid laundry basket on a pack frame; though admittedly, I often take it off and stockpile with smaller stackable containers. Or use a regular super padded backpack that is more comfortable.

Prices?

These are highly variable depending on the market you are in and the current annual production regionally, continentally, and internationally. Also, how honest your buyers are, how well they like you (usually based on volumes and consistency), etc, etc. Here are some generalizations. The bigger the buyer the smaller the prices they are willing to pay—they don’t need you. It is always best to find a local or regional restaurant. Small private orders can be economically mailed via Canada Post if the product is dried and vacuumed packed in a large bag. As long as it is no more than 2 cm thick the “letter” can then be sent for \$3.65 while weighing up to a 500g (one pound is 454g). Otherwise it may cost \$10-15 to send a single pound of dried mushrooms! Some good advice would be to offer some mushrooms for free so restaurant chefs can try your product. Showcase your offerings in the “local foods fall feast” when it comes to town and or a farmers market. I have given away 20 pounds of primo king boletes and paid the freight! It costs money to make money. Also be willing to take some lumps. I once negotiated a price of \$35 a kilo and sent 100 pounds, at my expense. They landed safe and sound and the buyer suddenly only wanted to pay \$30, for no reason, and “throw out” 4 kilos as “not meeting grade and unsaleable” (despite that I checked each one personally!). My \$1540 shipment was now worth \$1200. I was pissed and screamed “rip-off artist” all over the living room! But, I took my lumps, and smiled, as this was my first shipment to him. He is now one of my better buyers. Demanding, yes, occasionally a week late paying, yes, but honest, dependable, accurate, and trustworthy. For others, I had to wait to get on their list. \$10 for King boletes... no way! 6 months later while lining up the summer orders - \$15! Still I said - no way. Two years later \$40 for primo and \$30 for grade A. Deal! One 22Kg box a week? Excellent. Once the deals start with a given buyer you are usually “in” so to speak. Don’t ask why it happened all of a sudden and don’t give up on any of them. Maybe there was a falling out with a supplier or a source dried up. Who knows or cares? Just produce an accurate and honest picture of what you think you can do and keep them informed if it looks like a crop is failing (and they will!). If you stick around long enough you will hit the lottery. Your crops of “whatever” will be burgeoning while others are failing and prices may jump from \$20 to \$400 a kilo like they did in NY for kings awhile back. Yes, 500 kgs buys a house! You will likely never see these prices as a picker unless you know a local restaurant that can’t pick its own. These prices are paid in big cities with a traditional and strong market to established buyers often with brick and mortar storefronts and where the nearest mushroom is 80 km from the city limits if someone hasn’t picked it already—and trust me, they have!

However, never, ever, sell them for less than \$5 a pound or \$11 to \$12 a kilo or make the buyer pay the freight if the price is that low. Some choice species command good prices and can be abundant in ideal habitats (100-200 pounds an acre spanning two weeks). Five dollars doesn't sound like much until you fill two laundry tubs in 3 hours and cart away \$400 or \$133 an hour!

The Who's Who. So, who does this sort of thing? Teachers are off all summer and extra cash once a week is always welcome. I know a lady that has some patches worth \$2,000 each, who travels in winter with her mushroom money! Another is a commercial fisherman,

who is bored in August and knows he can make over \$1000 a week from his secret patches. He sneaks around town and the woods roads and hides what he's doing with great effort. He never uses the local post office for shipping and vacuum-packs his own. Another is retired and welcomes the added income. It is not all college students, that is for sure. My best ever pay, so far, was almost \$1000/ hr. No joke. I can often make over \$100/hr after I get on site if I subtract the travel/shipping/handling time. These included, it is still most often over \$50/ hr. This will not happen in year one. It is like salmon fishing, moose hunting, or berry picking. You're not going to fill the pan of the truck the first time you ever try it. Once you can fill the pan, one might do well to remember how many days of work it took you to get there when demanding prices. Or letting others in on what you are up to on the way to your secret waterfalls swimming hole with trusted friends, walking past \$500 mushroom patches. Nothing spoils things faster than money, fear, worry, and suspicion.



Craterellus sp.

Both *My Descent into the Dark Side of Foraging* and *Commercial Picking 101* were first published in *Omphalina*, Vol. IV, No 9, October 14, 2013, the newsletter of Foray Newfoundland and Labrador. All photos were taken by the author, Walt Endicott.

Note from the Editor: I personally found these two articles somewhat disturbing, seeing how the number of people foraging for mushrooms and other wild plants and then selling them in markets and to restaurants has grown exponentially over the past several years. On the other hand, everyone has to make a living somehow and I cannot think of a more pleasant way to pay the bills. I invite you to write to us at dianna.smith@comcast.net and let us know how you feel about these

NAMA 2013 AWARD RECIPIENTS

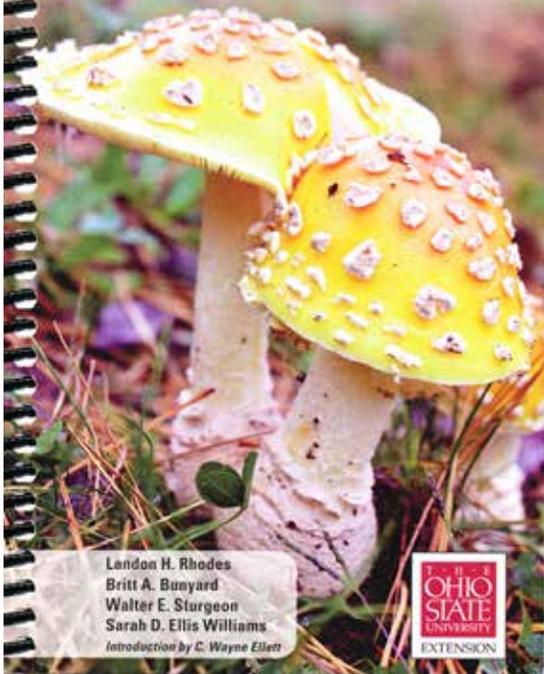
NAMA is pleased to announce and congratulate the winners of two of its most prestigious awards: the *Award for Contributions to Amateur Mycology* goes to author, educator, entrepreneur Paul Stamets; and *The Harry and Elsie Knighton Service Award* goes to John Dawson of the Eastern Penn Mushroom Club.

The 2013 Award for Contributions to Mycology is given annually to recognize a person who has contributed extraordinarily to the advancement of amateur mycology. Its recipients have often extensively conducted workshops, led forays, written or lectured widely about mushrooms and identifying mushrooms, all on a national or international level.

The Harry and Elsie Knighton Service Award was established by the NAMA Board of Trustees to recognize and encourage persons who have distinguished themselves in service to their local clubs. It is named for the Knightons, whose efforts began the North American Mycological Association in 1967.

Details about the honored recipients will be featured in the January-February 2014 issue of *The Mycophile*.

**Mushrooms and Macrofungi of
Ohio and the Midwestern States:**
A Resource Handbook



Mushrooms and Macrofungi of Ohio and the Midwestern States: A Resource Handbook

Landon H. Rhodes, Britt A. Bunyard, Walter E. Sturgeon, Sarah D. Ellis Williams, Introduction by C. Wayne Ellett

The Ohio State University Extension Bulletin 942

2013; 163 pages; spiral bound

\$26.25

Order from OSU Extension's online market: estore.osu-extension.org

This small handbook from OSU Extension represents another in the growing lineup of state or narrow regional mushroom guidebooks. Page-size is roughly 4.5 × 7 inches and the book would fit in a large coat or pants pocket. Although there is no mention of a specific purpose or audience for the book, one of the authors indicated to me that it is intended primarily for beginning mushroom hunters.

The book begins with brief Introduction and Terminology sections (6 pages in total, not illustrated) that address which mushrooms are safe to eat, often-heard edibility rules of thumb, collecting wild mushrooms, and the parts of a typical mushroom, and end with a glossary of a small handful of other terms. The Identification section comprises the bulk of the book and presents the species treatments (149 pages). One page of References and Resources—a list of seven books, magazines, and websites—and the Index, which includes common names and scientific names by genus, finish things off.

The identification section is divided into color-coded subsections, using an unconventional breakdown that mixes a family name (Tricholomataceae), genus names (e.g., *Amanita*, *Lepiota*), morphologic types (e.g., boletes, chanterelles), and common names (e.g., inky caps, carbon fungi), along with “miscellaneous mushrooms.” The morphologic types are neither described nor illustrated and the family and genus names will be effective only for users who already are familiar with them. There are no keys or other identification aids other than the organization scheme, and no indication as to how the authors intend the book to be used (picture-matching presumably).

Species are presented mostly one per page, although in some cases two or more species, or even a larger group, are covered. Each treatment includes the color-coded section name in the upper outer corner and a matching colored area around the page number, a common name in large font (the main heading) and scientific name in a smaller font, a commentary paragraph, other scientific and/or common names, and a photograph, sometimes accompanied by a smaller inset photo. Most of the common names have been taken from previous books such as the Audubon guide. As is always the case when trying to use common names for everything, some of them are not in common usage, such as rounded earthstar (*Geastrum saccatum*), stalked hairy fairy cup (*Dasyscyphus virgineus*, now usually placed in the genus *Lachnum*), and ash lover (*Perenniporia fraxinophila*). Most of the scientific names are up to date and usually the prior name is given when it might be more familiar to readers. The commentaries are very brief and vary in the information presented. Typically they might include some descriptive information, interesting tidbits of general information, mention of similar species, and/or whether the species is edible or not in cases of good edibles and toxic species. In very few cases, however, does a commentary provide sufficient information to support a confident identification.

The main photographs occupy the lower ½ to ⅔ of the page. In some cases, tiny inset photos are superimposed on the main image. Some of these are helpful but many are too small to present the subject clearly. Occasionally, the featured species is presented in the inset and a different species is shown in the large photo, which I found confusing. It appears that most of the original photos were good ones—although some of them appear to have been selected for their artistic appeal rather than their usefulness for identification purposes—however the designer “zoomed in” on the subjects and then applied a vignette filter that makes many of the images cloudy. This reduces both their attractiveness and usefulness and also removes surrounding habitat elements that could provide scale (few of the commentaries include any specific size information). Thus, for instance, someone unfamiliar with puffballs who scanned the photos of *Lycoperdon echinatum* and *Calvatia gigantea*, which appear on facing pages, would not realize that the diameter of the latter can be 10 or more times that of the former (although the text does provide information about the relative sizes).

It appears that writing of the commentaries was divided among the authors and that not a lot of editing was done to provide consistency among them. For instance, in the Puffballs section, reference is made to earthballs (the usual common name for species of *Scleroderma*) and the fact that many of them, unlike puffballs, are inedible or toxic. However, the common names used for *Scleroderma citrinum* and *S. polyrhizum* are pigskin poison puffball and earthstar scleroderma, respectively. “Earthball” is only mentioned under Other Common Names.

The roughly 150 species treated in the book (a smut, ergot, and four slime molds are among them) are mostly ones that appear in many other guides. Only 10 to 15 are ones not often found elsewhere. Polypores are accorded special attention (32 species), probably because the three OSU authors are plant pathologists.

So, would this be a good book for a beginning mushroom hunter? I think not—at least not by itself. The combination of sparse un-illustrated introductory material, lack of a glossary other than definitions of a small handful of terms, the very brief descriptive information, and the zoomed-in photos would make it hard for a beginner to reach accurate identifications. More experienced users might find it easier to work with but, given that most of the species are included in other books that many mushroom hunters would already own, it is uncertain how much this book would increase their ability to make identifications. On the other hand, book collecting is for most of us a necessary adjunct to mushroom collecting and the information that is presented is sound so this volume could serve as a handy adjunct for those who have a basic library of more comprehensive guides and cash to burn. However, with a \$26.95 price tag, the book offers relatively little bang for the buck—there are many comparably priced guides out there that contain two or three times as many species along with more extensive information—so those who have to watch their budget closely might not want to put this one at the top of their wish list.

Steve Trudell

Reviewer's Note

In my review of *The Outer Spores: Mushrooms of Haida Gwaii*, published in the May-June 2013 issue of *The Mycophile*, I expressed my surprise that every species of *Cortinarius* and *Inocybe* in the survey project's species list was confidently named, with no qualifiers such as “cf.” attached. One of the authors recently informed me that, indeed, they did have a number of qualified names on the original list but removed them at the publisher's request.

Steve Trudell

Hebeloma Project

For the last decade my mycological studies have been totally focussed on the genus *Hebeloma*. This genus has long been regarded as a genus within which determination to species level is difficult. Within Europe there are over 260 published names while in North America there are some 210 additional published names. My studies began following a workshop with Jan Vesterholt, who had already spent some 15 years studying *Hebelomas* in Europe. In 2005 he published his book *The Genus Hebeloma* as part of the Fungi of Northern Europe series. By then we were working closely together and had also joined forces with Ursula Eberhardt who was a specialist on molecular analyses of fungi. With her help we were able to bring a new dimension to the study of the taxonomy and phylogeny of the genus. We were also able to utilize the functionality of a powerful database tool, Biologics, to compare hundreds of morphological characters (macroscopic and microscopic) and photographs of each collection. Unfortunately Jan's untimely death in 2011 did cause a hiatus in our work but Ursula and I did eventually manage to kick on with the project.

To date our studies have been focused on European collections. We have built a database of almost 4000 collections, of which about 3750 are European and about 150 from North America. Our database also contains details of all the European holotypes, isotypes, lectotypes and neotypes that we have been able to locate. For each collection we try to enter data with regard to all morphological characters, macroscopic and microscopic, together with all molecular characters which will normally include at least an ITS sequence and often sequences from several loci.

We hope in the next months to be able to publish a monograph on the genus *Hebeloma* in Europe as part of the *Fungi Europaei* series. This will describe in detail some 80 species of *Hebeloma* in Europe, provide keys based on morphological characters and also extensive molecular data. It will also include a commentary on all the existing European names, on their synonymies and their various interpretations. The monograph will also describe a number of new species that we have discovered during the course of our studies; we are sure that there are still more new species to be described in Europe and we hope that our monograph will act as a catalyst to enable this discovery. We would not be surprised if we find the need to update the book with a new edition within just a few years.

We are already planning to extend this work to the rest of the world. The next major area we wish to address is North America. As well as understanding the North American taxonomy we also hope to address the overlap between North America and Europe. In order to make this study meaningful we will need a number of collections from throughout North America. We are asking for help to assemble these collections. Ideally we need good collections, carefully dried and with good pictures. We also need good macroscopic descriptions; we can attend to the microscopic descriptions. We would happily send a 'proforma' for the macroscopic description to anyone willing to collect for us. Our intention will be a future monograph on the *Hebelomas of North America*, although this is probably several years away. However, we will of course send information regarding our determinations to contributors of material.

Joel Horman has kindly agreed to act as receiver North American collections which he will then package together to send on to us. We would appreciate any help we can get with this project.

Henry Beker

Please send *Hebeloma* specimens to Joel Horman, at 11 Ramblewood Rd., Ridge, NY 11961. You may also contact via his e-mail address: jlhorman@optonline.net.



for

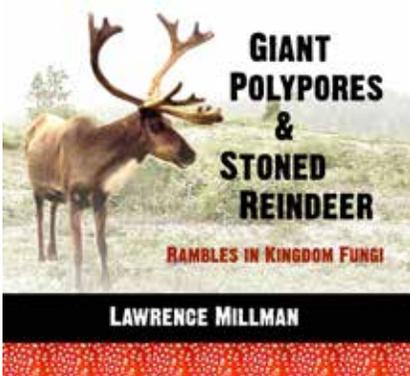
Joel

COLLECTING FOR THE TABLE: A POLEMIC

By Lawrence Millman from his new book *Giant Polypores and Stoned Reindeer*

Increasingly, I object to the idea of collecting mushrooms for the table. The table to which I'm referring is not one's dinner table, for I have no objection to the harvesting of wild edibles. No, I mean the collection tables that occupy pride of place at local and regional forays of several days' duration.

Here's the scenario: a brigade of mushroom hunters lights out for the woods, each of them armed with a capacious basket. Into these baskets they'll toss every specimen they find, *Amanita* or *Mycena*, *Russula* or *Crepidotus*, polypore or cup fungus, then bring back their booty for the foray's experts to sort out and identify. The specimens will be accompanied by a dearth of data. What's the substrate? "Under a tree" or "on a log," the collection notes might say.



At this point, the experts -- often thirty-something males eager to brandish their egos -- will put names on the specimens with such alacrity that they could easily be tossing confetti. Never mind that many of the specimens on the table can be identified only with the assistance of a microscope.

The tables in question will have hundreds of paper plates on which the mushrooms rest forlornly while they wait to have names put on them. At a Pennsylvania foray I recently attended, there were perhaps a dozen plates piled high with the same *Boletus* species. If I were a mycelium, I'd be greatly disturbed by this sort of thing. I might even try to evolve a different, scarcely visible fruiting body, the better to keep it from ending its life on a collection table.

But there's worse to come. All during the foray, the specimens will remain on their plates, becoming "dehydrated, shriveled, and stanced from releasing spores," in the words of mycologist Nick Money. In the end, virtually all of them will be dumped into a plastic garbage bag. Not set aside for an herbarium. Not spreading any spores. Not oven-dried for future use. Not even dined upon. Simply turned into trash. Hardly a fate that any self-respecting mycelium would wish on its creation.

Will, at least that mycelium itself is not disturbed, you might say. But not so fast. The mycological jury has not yet come up with a verdict on this subject. For much of a mycelium's biomass and an undetermined portion of its energy is transferred to its fruiting bodies, which are in effect its reproductive organs. How would you like it if someone came along and yanked off your genitalia? I suspect the mycelium might feel the same way...

To collect or not to collect, that is the question. Personally, I think it's nobler to study the objects of one's interest in the field rather than watch them dessicate on a table. And if mycophiles do that, they might find out how different species relate to their respective environments. They might also ask themselves some important questions: why, for example, are insects congregating on a certain species? What's the smell of a particular species when fresh? And what the blazes is the tree under which a particular specimen is growing.

So, please, let's try to collect a little less promiscuously. If you don't pounce upon every frog, possum, warbler, butterfly, maple sapling, or trillium you see and toss it into your basket, then you shouldn't engage in such pouncing with mushrooms. In fact, mushrooms -- more than almost any other organism -- are essential for environmental health, climate control, and the maintenance of biodiversity. Vastly more than a certain brash hominid I know...

In the end, too much collecting might mean fewer mushrooms, which could result in less genetic diversity, which in turn might result in even fewer mushrooms. With too few mushrooms, there's always the possibility that a species might become critically endangered or even extinct. And -- to quote Oscar Wilde -- you don't want to kill the thing you love, do you?

Furthering Macrofungi Conservation through Citizen Science

By Shannon Asencio,

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The Macrofungi Collection Consortium (MaCC), a collaborative project including 35 research institutions in 24 states, seeks to raise the profile of macrofungi and create a national census of these important species. MaCC strives to establish an enduring collaboration among institutions with macrofungal collections, and also between professional and citizen mycologists. On October 23, 2013, MaCC unveiled its new crowd-sourcing initiative, which is being hosted by the Notes from Nature website.

Most macrofungi collections are housed in herbarium cabinets, where they are not readily accessible to citizens and researchers. To allow macrofungi collection information to be used to its full potential, there must be improved digital access to these data. The challenge with getting all of this information out into the world is that the amount of data that exist about these collections is tremendous, and complete digitization is beyond the capabilities of herbarium employees.

The Notes from Nature transcription project is a citizen science platform that was launched to address this challenge by allowing contributors to digitize the world's natural history collections, one record at a time! The coming winter months, and inherent lull in mushroom collecting in many regions, no longer necessitate taking a break from the world of mycology. Notes from Nature makes mushrooms available year-round!

Contributing to the larger scientific goal of understanding what macrofungi species we have out there, and where and when they were collected, is a great way to help conserve these wonderful marvels of nature. Get started today at <http://www.notesfromnature.org/#/archives/macrofungi>.



North American Mycological Association

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Newsletter of the North American Mycological Association

THE **MYCOPHILE**



Photo and description are by Tom Bigelow of the New York Mycological Society.

***Hemitrichia serpula*,**

Pittsfield Massachusetts, September 29, 2013

The fruiting bodies of most species of *Hemitrichia* consist of more or less stacked balls that burst open to release the spore-bearing tangle of threads—the capillitium. *Hemitrichia serpula* has a different approach, forming yellowish/brownish cylindrical fruiting bodies in a haphazard network, covering an inch or so of wood debris. The general effect is that of a tiny pretzel. On the left of the picture, the skin of the fruiting body has ruptured, releasing

the yellow capillitium. Another slime mold, *Metatrachia vesparium*, can be seen in the upper left.